AMENDMENTS TO THE CLAIMS

1. (Amended) An optical switch comprising:

a substrate for transmitting an optical signal within the substrate, where said optical signal propagates in the substrate in a first <u>propagation</u> direction <u>along a first plane</u> under total internal reflection; and

a diffractive optical element disposed above a top surface of the substrate and moveable relative thereto between a first position substantially out of evanescent field coupling with the optical signal, such that the optical signal continues to travel in the first direction, and a second position in evanescent field coupling with the optical signal to alter the propagation of the optical signal <u>in the substrate</u> into a second <u>propagation</u> direction <u>along a second plane that forms an acute angle with the first plane</u>.

2. (Original) The optical switch of claim 1, wherein the substrate is formed of a material from the group consisting of quartz and sapphire.

3. (Original) The optical switch of claim 1, wherein the diffractive optical element is a holographic optical element.

4. (Original) The optical switch of claim 1, wherein said diffractive optical element is formed of a plurality of strips forming a diffraction grating, where each strip has a substantially equal width and where each of the strips are spaced apart a substantially equal spacing.

5. (Original) The optical switch of claim 4, wherein the width is substantially identical to the spacing.

6. (Original) The optical switch of claim 4, wherein the diffraction grating has a grating period, 'a', that is substantially equal to the wavelength of light of the optical signal in the substrate.

7. (Original) The optical switch of claim 4, wherein the diffraction grating has a grating period, 'a', that is between .5 λ and 3 λ, where λ is the wavelength of the optical signal in the substrate.

8. (Original) The optical switch of claim 4, wherein the strips are flexible for moving the diffractive optical element between said first position and said second position.

9. (Original) The optical switch of claim 8, wherein the strips are suspended from an anchor fixedly mounted to the substrate.

10. (Original) The optical switch of claim 4, wherein the strips are suspended from a first anchor and a second anchor by flexible members, where both said first anchor and said second anchor are fixedly mounted to the substrate and where the flexible members allow movement of the diffractive optical element between said first position and said second position.

11. (Original) The optical switch of claim 4, wherein the strips are biased in the second position, and wherein an electrode is disposed adjacent the strips for moving the strips into the first position.

12. (Original) The optical switch of claim 4, wherein the strips are linear and substantially perpendicular to a line bisecting an angle, θ_p, between the plane containing the input signal and the plane containing the output signal.

13. (Original) The optical switch of claim 4, further comprising cross connections formed between the strips.

14. (Original) The optical switch of claim 4, wherein the strips are formed of a material selected from the grouping consisting of amorphous silicon, crystalline silicon, and poly-silicon.

15. (Original) The optical switch of claim 4, wherein the strips are formed of a material selected from the group consisting of alumina, sapphire, silicon nitride, and a poly-silicon/poly-germanium alloy.

16. (Original) The optical switch of claim 4, wherein the strips have an index of refraction higher than that of the substrate.

17. (Original) The optical switch of claim 4, wherein the strips have a thickness above 1 μm.

18. (Original) The optical switch of claim 17, wherein the strips have a thickness selected to maximize the intensity of the optical signal in the second direction.

19. (Original) The optical switch of claim 4, wherein the strip width is selected to maximize the intensity of the optical signal in the second direction.

20. (Original) The optical switch of claim 1, wherein the diffractive optical element is in physical contact with the top surface of the substrate when in the second position.

21. (Original) The optical switch of claim 1, wherein the optical signal propagating in the second direction is propagating under total internal reflection.

22. (Original) The optical switch of claim 1, wherein the optical signal is reflected off the top surface of the substrate under total internal reflection.

23. (Original) The optical switch of claim 1, wherein the optical signal is reflected off the top surface and a bottom surface of the substrate under total internal reflection.

24. (Original) The optical switch of claim 1, wherein the diffractive optical element is composed of a substantially transparent optical material.

25. (Original) The optical switch of claim 1, wherein the diffractive optical element operates by total internal reflection.

26. (Original) The optical switch of claim 1, wherein said diffractive optical element is formed of a plurality of strips forming a diffraction grating, where each strip has a width and a spacing distance associated therein, such that the widths and the spacing distances for the strips vary.

27. (Original) A holographic optical element for use with an optical substrate, wherein an incident light signal is propagating within the substrate in a primary direction of propagation reflecting off a top surface of the substrate under total internal reflection, comprising:

a plurality of spaced-apart strips formed of an optically transparent material and disposed above the top surface of the substrate such that the strips collectively receive a first portion of the light signal and produce an output signal phase shifted from a second portion of the light signal reflected off the top surface of the substrate to produce a diffraction pattern within the substrate; and

a suspension member adjacent to the plurality of strips and disposed for allowing movement of the strips from a first position in which the incident light signal is altered by the

holographic optical element and a second position in which the incident light signal is unaltered by the holographic optical element.

28. (Original) The holographic optical element of claim 27, wherein the suspension member comprises a plurality of flexible arms mounted to the top surface of the substrate by a plurality of mounting members, the flexible arms being coupled to the strips.

29. (Original) The holographic optical element of claim 28, wherein the mounting members have a height such that the strips are biased in the first position.

30. (Original) The holographic optical element of claim 28, wherein the flexible arms are biased to return strips in the second position to the first position.

31. (Original) The holographic optical element of claim 28, wherein flexible arms are coupled to the strips to allow uniform movement of the strips into the first and second positions.

32. (Original) The holographic optical element of claim 28, wherein the flexible arms have a thickness equal to a thickness of the strips.

33. (Original) The holographic optical element of claim 27, wherein the suspension member does not extend above the top surface of the substrate.

34. (Original) The holographic optical element of claim 27, wherein the substrate is formed of sapphire.

35. (Original) The holographic optical element of claim 27, wherein the diffraction pattern has a grating period, 'a', that is between .75 λ and 3 λ, where λ is the wavelength of the incident light signal.

36. (Original) The holographic optical element of claim 27, further comprising an electrode disposed over the strips for moving the strips into the first and second positions.

37. (Currently amended) The holographic optical element of claim 27, wherein the strips are linear and substantially perpendicular to a line bisecting an angle, $\theta_{\underline{p}}$, between the plane containing the input signal and the plane containing the output signal.

38. (Original) The holographic optical element of claim 27, further comprising cross connections formed between the strips.

39. (Original) The holographic optical element of claim 27, wherein the strips are formed of a material selected from the grouping consisting of amorphous silicon, crystalline silicon, and poly-silicon.

40. (Original) The holographic optical element of claim 27, wherein the strips are formed of a material selected from the group consisting of alumina, sapphire, silicon nitride, poly-silicon, and germanium.

41. (Original) The holographic optical element of claim 27, wherein the strips have an index of refraction higher than that of the substrate.

42. (Original) The holographic optical element of claim 27, wherein the strips have a thickness selected to maximize the magnitude of the optical signal in an output direction of propagation.

43. (Original) The holographic optical element of claim 27, wherein the light signal propagating in the second direction is propagating within the substrate under total internal reflection.

44. (Original) A 1xN optical switch comprising:

a substrate for transmitting an optical signal within the substrate, where said optical signal propagates in the substrate in a first direction under total internal reflection; and

N diffractive optical elements disposed above a top surface of the substrate and each individually moveable relative to the substrate between a first position substantially out of evanescent field coupling with the optical signal, such that the optical signal continues to travel in the first direction, and a second position within evanescent field coupling with the optical signal to alter the propagation of the optical signal into a second direction, where N is an integer greater than 0.

45. (Original) The 1xN optical switch of claim 44, wherein each diffractive optical element is formed of a plurality of strips forming a diffraction grating, where each strip has a substantially equal width and where each of the strips are spaced apart a substantially equal spacing.

46. (Original) An optical switch for use with a substrate, the optical switch comprising:

a plurality of strips disposed above a top surface of the substrate for movement relative to the substrate, each strip being spaced apart a spacing distance and having a strip width, whereby the sum, 'a', of the spacing distance and the strip width is chosen such that a light signal traveling within the substrate under total internal reflection along a first plane and incident upon an area of the top surface below said strips is reflected into a first diffracted order propagating within the substrate in a reflected direction of propagation along a second plane defining an acute angle, θ_p, with respect to the first plane ~~incident direction of propagation~~ and propagating within the substrate under total internal reflection.

47. (Original) The optical switch of claim 46, wherein the sum, 'a', is between .5 λ and 3 λ, where λ is the wavelength of the light signal within the substrate.

48. (Original) The optical switch of claim 46, wherein the light signal is incident upon the diffraction grating at an angle, θ, equal to or greater than 35°, θ being measured from a normal to the top surface of the substrate extending into the substrate, and wherein the sum, 'a', is chosen such that θ_p is larger than 20° is between about 90° and about 145°.